

FLIGHT

The
**AIRCRAFT
ENGINEER
&
AIRSHIPS**

First Aero Weekly in the World.

Founder and Editor: STANLEY SPOONER

A Journal devoted to the Interests, Practice, and Progress of Aerial Locomotion and Transport

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DIARY OF FORTHCOMING EVENTS

Club Secretaries and others desirous of announcing the dates of important fixtures are invited to send particulars for inclusion in the following list:

Mar. 15	Entries close for Dutch Height Indicator Competition.
Mar. 15	Lecture, "The Control of Aeroplanes at Slow Speeds," by Professor B. Melvill Jones, before R.Ae.S.
Mar. 23	Entries close for Gordon Bennett Balloon Race
Apl. 12	Lecture, "Some Controversial Points in Aircraft Design," by F. T. Hill, before I.Ae.E.
May 11	Lecture, "Experimental Flying," by Maj. M. E. A. Wright, before I.Ae.E.
June 25-30	International Air Congress, London
June 30	R.A.F. Aerial Pageant
July	Air Race for King's Cup
July 20	Göthenburg Exhibition
Aug. 6	Aerial Derby
Aug. 6-27	French Gliding Competition, near Cherbourg
Aug. 8-12	F.I.A. Conference, Göthenburg.
Sept. 23	Gordon Bennett Balloon Race, Belgium
Sept. 28	Schneider Cup Seaplane Race at Cowes
Dec. 1	Entries close for French Aero Engine Competition
1924	
Mar. 1	French Aero Engine Competition.

INDEX FOR VOL. XIV.

The Index for Vol. XIV of FLIGHT (January to December, 1922) is now ready, and can be obtained from the Publishers, 36, Great Queen Street, Kingsway, W.C. 2. Price 1s. per copy (1s. 1d. post free).

EDITORIAL COMMENT.



The Million Pound Scheme

LAST week reference was made in these notes to the suggested scheme for subsidising a civil air transport company to the extent of one million sterling, spread over a period of ten years. While we agreed that, fundamentally, the scheme appeared to be promising, we pointed out certain safeguards which would have to be taken. As a matter of fact, we could go on almost indefinitely enumerating provisos, so numerous are the "if's" that come to mind. However, we propose to confine ourselves this week to calling attention to certain features of the scheme for which we had not the space last week.

We understand that the Society of British Aircraft Constructors was not officially consulted. On the face of it, this may appear an extraordinary state of affairs, but it may be pointed out that the S.B.A.C. has not, in the past, taken any official action in matters relating to civil air transport, and presumably it was this fact which caused the Subsidies Committee to refrain from approaching the Society officially. Some members of the S.B.A.C. were apparently consulted, but in most cases rather for their experience of air transport.

The fundamental fact to be kept in mind is that the new company, as it will have, in the main, to work out its own commercial salvation, cannot in all fairness be interfered with by Government action to any but the smallest extent. At the same time, as a subsidy of one million is being granted (assuming for the moment that it will be forthcoming), the taxpayer is entitled to exert, through the Air Ministry, a certain amount of influence as to the manner in which the subsidy is to be spent, in order that he may feel that the best interests of the country are being served.

Thus, in the matter of choice of routes and machines, it will be obvious that the company must decide purely on a commercial basis, although closely allied with the problem is the potential military value to the country of the route chosen and, to a smaller extent, of the machines decided upon. It can easily be imagined that one route might be of great military value, but might be so unpromising from a commercial point of view that it could not be contemplated by a company whose first duty was to make the service pay.

There is then the question of types of machines. The argument is often advanced that commercial aircraft could, in time of war, quickly be converted into troop transports, bombers, etc. Personally, we are somewhat doubtful on this point. To us it appears rather that we have come to the parting of the ways, and that the military and commercial types will, in the future, tend to become more and more specialised, and that, therefore, the question of the possibility of conversion becomes less and less important. Rather do we think that the development of the truly commercial aeroplane should be quite unhampered by any other considerations than to make it safe, reliable and economical.

Again, on the question of personnel, we are of the opinion that—without any direct thought to their usefulness in time of war—the pilots, navigators and ground staff would gain such experience in their everyday life as would be of the utmost value to the country in time of need. The pilots and navigators would be skilled in their *métier* as such, and any specialised knowledge which might be required of them for war emergencies could be acquired in a very short course of instruction. A possible exception to this would be seaplane personnel, and we confess that we are not without misgivings as to the way in which considerations of the seaplane have been omitted in the report. After many years of neglect, the seaplane is at last to be given an opportunity to develop, and a service is being started this spring between Southampton and France and the Channel Islands. Now, it is at any rate conceivable that the new company may decide that, as little or no data on seaplane services are available, it will not speculate on a relatively uncertain seaplane undertaking, when there is a lot of information available relating to aeroplane services. Thus the seaplane may be left out entirely, which would be a catastrophe in view of the value which a trained seaplane personnel would have in a case of national emergency. The problems in seaplane work are quite different from those of land machines, and the training of personnel is considerably more difficult. Yet under the new scheme the country has no guarantee that seaplanes will not be dropped entirely.

In the placing of orders for machines, the new company may be regarded as a customer, unbiassed and buying in the open market. On the face of it, therefore, it may be assumed that the orders will go to the firm which produces the best machine. At the same time, looking upon the matter purely from a business point of view, as the new company must and will do, does it not appear probable that the decision will go to an existing type of which reliable information is available, rather than to a possibly more promising type as yet in its experimental stage? And certainly for the sake of economy the number of different types will be reduced to a minimum so as to reduce

the number of spares, etc. Once a type has been standardised it will not easily be discarded for a new, unless the latter shows startling improvements, and as a very large proportion of the expenses of running a service is connected with matters outside the machines used, there is, we think, considerable danger of stagnation in design. It is even possible to visualise the establishment by the company of its own aircraft factory, a state of affairs which would leave the entire aircraft industry out of the running, and entirely vitiate the purpose for which the million sterling subsidy was granted. This is a possibility which has not, we think, been given the consideration which it deserves. The company is to be given a virtual monopoly of air transport. We do not want to see that turned also into a monopoly of construction. At least, provision should be made against such a situation arising.

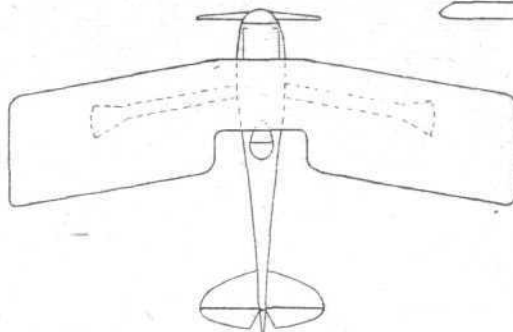
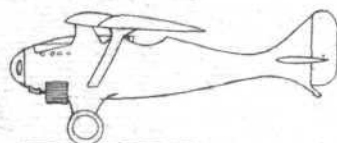
Probably the fairest commencement would be by the asking for designs to certain specifications, drawn up by, or on behalf of, the company, every aircraft firm in the industry receiving the specifications and being asked to supply designs. The drafting of the specification and the judging of the designs would be no easy task, but with all its possibilities of things going wrong could, it appears to us, be made fairer to the industry in general.

What of Seaplane Schools?

In connection with the R.A.F. Reserve scheme, details of which were published in our issue of February 15, 1923, it was announced that four civilian flying schools would be established, one at Edgware, one at Bristol, one at Coventry, and one at Glasgow. That is all to the good, but what of the sea? Surely it is at least as important to have a school where pupils may learn to pilot seaplanes. The whole training of seaplane personnel is far more difficult than the training of the corresponding land personnel. Yet the Air Ministry appears to have overlooked entirely the question of a civilian seaplane school. Even if the Air Ministry has not the foresight and knowledge (there are precious few officials with seaplane knowledge now serving in the Air Ministry, and most of those who do possess it are in departments where their knowledge is of no use) to appreciate the vital importance to the nation of developing the seaplane, surely in its own interest it might be expected not to give the Navy a peg on which to hang its hat, by affording the advocates of a Naval Air Service one more opportunity of complaining that nothing is being done with seaplanes and marine aircraft and personnel in general.

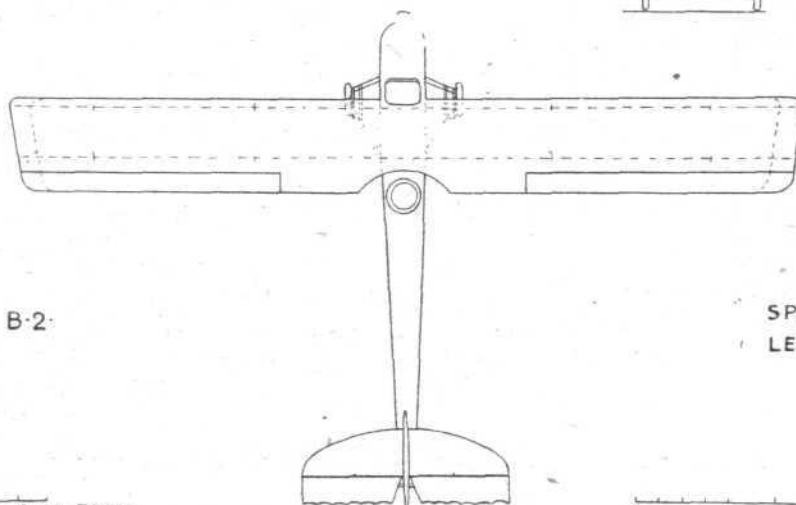
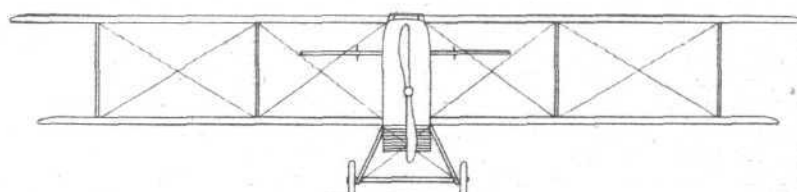
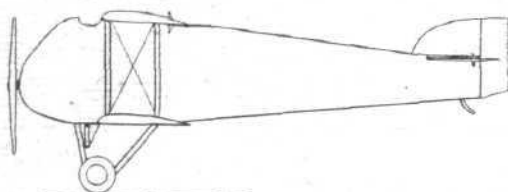
We know perfectly well that the reply to this argument will be that the Air Ministry is limited by the Treasury. Certainly it is, but we do submit that it would have been far better to have established but three land flying schools and one seaplane school. The cost would then have been no greater, and the interests of the nation (and incidentally those of the Air Ministry itself) would have been better served. There is still time to reconsider the situation, and we strongly urge that some such arrangement be made. The Air Ministry killed airships, and may be now regretting it. To the ordinary observer it appears very much as if the Air Ministry was doing its level best to kill seaplanes, and we are quite certain that it will—if it lives long enough for the Navy to come along and take over seaplane work—regret it more even than it regretted airships.

FRENCH ALL-METAL MACHINES



BUSCAYLET-DE MONGE

SPAN 35'9"
LENGTH 23'0"

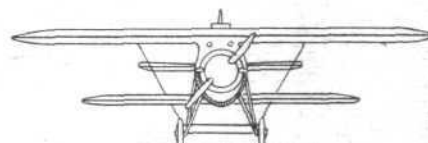
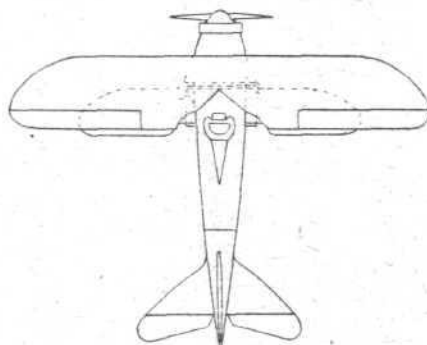
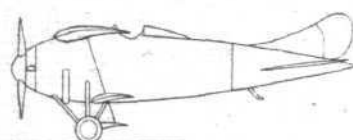


FARMAN B-2

SPAN 55'10"
LENGTH 35'1"

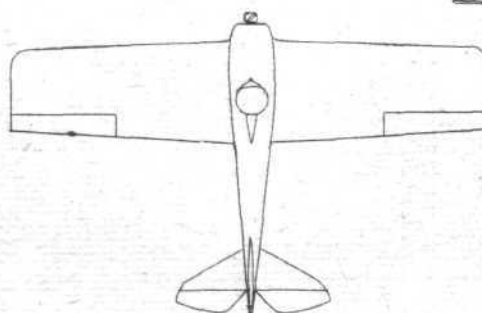
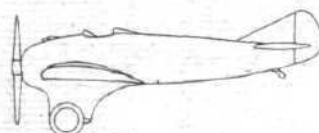
0 2 4 6 8 10 12 14 16 18 20 FEET

0 1 2 3 4 5 6 METRES



HANRIOT H-26

SPAN 29'6"
LENGTH 24'2"



S.I.M.P.

SPAN 33'5"
LENGTH 21'4"

SOME FRENCH ALL-METAL MACHINES : These general arrangement drawings are all to a uniform scale in the manner originated by FLIGHT three years ago, and their relative size is therefore easily appreciated.

THE ROLLS-ROYCE "EAGLE IX" AERO ENGINE

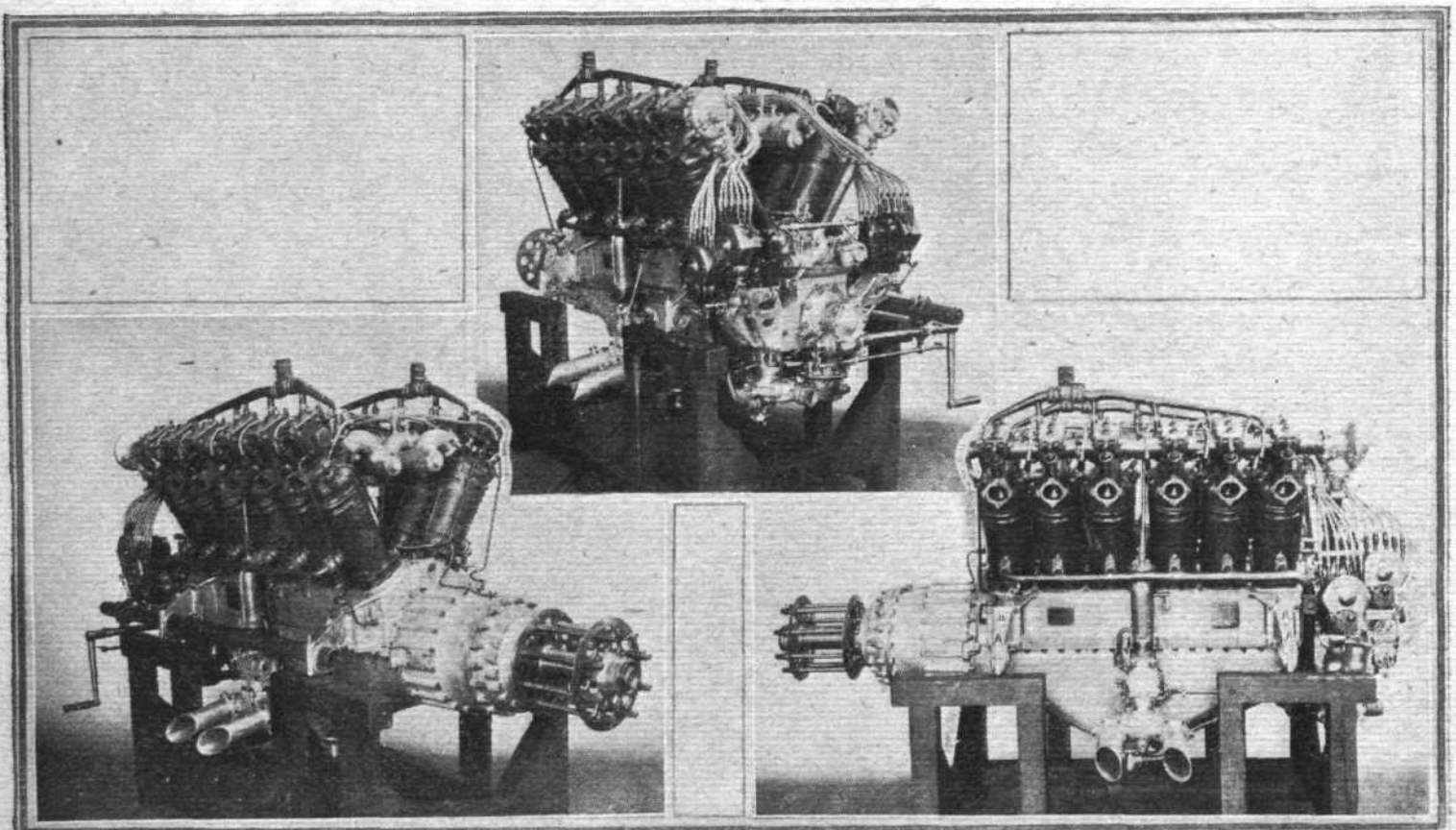
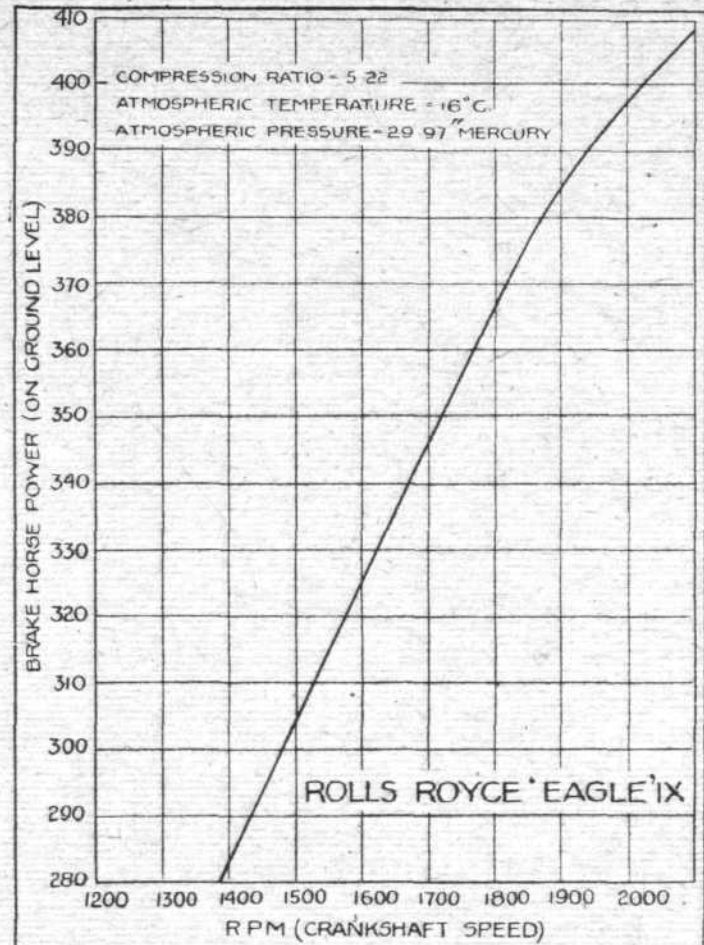
IN our issue of December 14 last, brief reference was made to a new aero engine that had recently been introduced by the Rolls-Royce Co., and we now give some further particulars, together with illustrations and a power curve, of this engine.

The engine in question is known as the "Eagle IX," and in general design resembles the "Eagle VIII," which has proved itself to be an exceptionally successful and reliable aero engine. As is well-known, the "Eagle VIII," originally a war product, not only achieved success in war-work, but later figured prominently in many peaceful record flights throughout the world—notably on the Atlantic flights of Alcock, and Lient. Sacurdura Cabril. As practically all the surplus stock of "Eagle VIII's," necessarily left on the Government's hands at the Armistice, is by now disposed of to various concerns in all parts of the world—the reputation of this engine being such that it was "eagly" sought after—there is no question that the production of another engine of similar type, with promise of even better performance, will meet with a satisfactory reception.

The "Eagle IX," as previously stated, follows the same general design of the "VIII," being a 12-cyl. water-cooled, V, with a bore and stroke of $4\frac{1}{2}$ ins. and $6\frac{1}{2}$ ins. respectively, developing 360 h.p. at 1,800 r.p.m. From the considerable amount of practical experience in the air, followed by much experimenting and testing with the "VIII" it has been possible to introduce several important improvements into the design, resulting in the production of the "IX."

These improvements in design give the "IX" several advantages over the "VIII," the most important of which may be stated as follows: In place of the four carburettors as originally fitted to the "VIII" two are now employed, and these are located low down on the centre line of the crank-case, one on each side of the engine with the induction leads passing up between the third and fourth cylinders to the manifolds supplying each group of three cylinders. The substitution of two carburettors in place of four not only considerably facilitates engine tuning and improves the mixture to the various cylinders, but their low position enables gravity feed being used in as many cases as possible, the float feeds having been redesigned for this purpose. Thus the engine will now function satisfactorily with a head of petrol only 8 ins. above the centre line of the

crankshaft—a feature of some importance. The danger of fire has also been considerably reduced by certain alterations in the design of the carburettors.



Three views of the Rolls-Royce "Eagle IX" Aero Engine, an improved version of the famous "Eagle VIII." The power curve of this engine is shown above.

As regards the rest of the design, certain modifications in details have been made, wherever experience has shown that improvements could be effected, resulting in increased strength or wearing qualities, and a particularly smooth running of the engine without "rough spots." Furthermore, it is claimed that it is easy to maintain the running of the engine in this condition.

A hand starting gear is fitted, and the handle for this may easily be changed over to whichever side of the engine is most accessible, or if desired chain wheels may be employed to bring the handle of the starter down to any position required. The amount of piping in the petrol feed has been

reduced to a minimum, and rubber connections eliminated. All the controls are led to one point, at the rear or lay-shafts, thus simplifying the installation and changing of engines. The usual Rolls-Royce epicyclic reduction gear is, of course, fitted.

The principal characteristics of the "Eagle IX" are:—Bore, 4½ ins.; stroke, 6½ ins.; normal crankshaft speed, 1,800 r.p.m.; maximum do., 2,000 r.p.m.; normal propeller speed, 1,080 r.p.m. (gear ratio, 6; normal b.h.p., 360; weight (less water, oil, hand-starting gear, propeller boss, exhaust boxes, and engine feet), 900 lbs.; petrol consumption, 25 gals. per hr.; oil consumption, 1 gal. per hr.

THE LONDON-CONTINENTAL SERVICES

FLIGHTS BETWEEN FEBRUARY 18 AND MARCH 3, INCLUSIVE

Route (including certain diverted journeys)	No. of flights*	No. of passengers	No. of flights carrying		No. of journeys completed†	Average flying time	Fastest time made by	Type and (in brackets) Number of each type flying
			Mails	Goods				
Croydon-Paris ...	30†	56	8	21	27	h. m. 3 2	Breguet F-CMAI (2hr. 16m.)	B. (1), D.H. 9 (1), G. (10), H.P.W.8B. (3).
Paris-Croydon ...	24	109	7	19	18	2 59	H.P.W.8B G-EBBI (2h. 14m.)	B. (1), D.H. 9 (1), G. (10), H.P.W.8B. (3).
Croydon-Brussels-Cologne	10§	41	9	—	9	3 48	D.H. 34 G-EBBR (3h. 2m.)	D.H. 18 (1), D.H. 34 (4).
Cologne-Brussels-Croydon	13	36	8	—	12	5 10	D.H. 34 G-EBBT (4h. 16m.)	D.H. 18 (1), D.H. 34 (4).
Croydon-Rotterdam ...	7	1	7	7	7	2 17	Fokker H-NABI (1h. 50m.)	F. (5).
Rotterdam-Croydon ...	8	5	8	8	8	3 18	Fokker H-NABR (2h. 32m.)	F. (4).
Manchester-Croydon-Amsterdam	12¶	61	1	3	12	6 15	—	D.H. 9 (1) D.H. 34 (3).
Amsterdam-Croydon-Manchester	15**	19	5	3	15	5 6	—	D.H. 34 (3).
Total for two weeks ...	119	328	53	61	108			

* Not including "private" flights.

† Croy.-Lym. 5, Lym. Croy. 8.

‡ Including certain journeys when stops were made *en route*.

§ Croy.-Brus. 1, Brus.-Col. 1.

|| Col.-Brus. 3, Brus.-Croy. 3.

¶ Man.-B'hm-Croy 6, Croy.-A'dam, 2.

** A'dam.-Croy. 5, Croy.-B'hm-Man. 9.

Av = Avro. B. = Breguet. Br. = Bristol. Bt. = B.A.T. D.H.4. = De Havilland 4, D.H.9. (etc.). F. = Fokker. Fa. = Farman F.50. G. = Goliath Farman. H.P. = Handley Page. M. = Martinsyde. Sp. = Spad. Vi. = Vickers Vimy. Vu. = Vickers Vulcan. W. = Westland.

The following is a list of firms running services between London and Paris, Brussels, etc., etc.:—Co. des Grand Expresses Aériennes; Daimler Hire, Ltd.; Handley Page Transport, Ltd.; Instone Air Line; Koninklijke Luchtvaart Maatschappij; Messageries Aériennes.

To Encourage Art

THE world is bettered in every respect by the advancement of Art, whether it be of the brush, music, "riding the wind" or other great civilising agent. To encourage great efforts to uphold this fact is the wish and duty of all who have the people's happiness and welfare at heart. When, in giving point to this axiom, England's national journal *Punch* takes up a case requiring assistance, we may be very sure there need be no hesitancy in holding out a helping hand to the same object. Hence, it is that we very willingly draw attention to an appeal issued this week through *Punch* by Sir Alexander Campbell Mackenzie, the Principal of the Royal Academy of Music, for funds to enable them to build a small students' theatre. It is backed by Mr. Philip L. Agnew, who, in addition to being Chairman of Directors of *Punch*, is Chairman of the Committee of Management of the Royal Academy of Music.

The Royal Academy of Music, which is the oldest of all the schools devoted to musical education in this country, has hitherto been largely supported by private subscriptions and donations, and throughout a century of activity the nation has never been asked for help. But the growing interest in native music and the constant increase in the numbers of those who seek admission to the Academy have made the provision of a small theatre, wherein British opera and drama may adequately be studied and performed, a matter of urgent necessity. The Academy itself and its patrons have subscribed to the full extent of their resources, and a suitable site behind the Academy in Marylebone Road has been secured by the governing body for £3,500;

plans have been approved, and of the cost of building and furnishing, amounting to £35,000, the Academy authorities can defray £10,000, whilst £6,000 has been raised by private generosity. This leaves a balance of £19,000 for which this appeal to the public is being made. So come up with your thousands, and let the good work be completed.

All donations should be sent to the Secretary, Royal Academy of Music, York Gate, Marylebone Road, N.W.

Sir John Salmond on Mosul

ACCORDING to *The Times* Baghdad correspondent, the church dignitaries, tribal sheikhs and other notables of Nejeef gave a cordial welcome to Sir John Salmond, the Air Officer Commanding, who, with members of his staff, paid a visit to the holy city of the Shiah, seven aeroplanes accommodating the party. Sir J. Salmond, after thanking the assembly for their reception, said:—

"As you all know, my own responsibilities are for the preservation of law and order. I am not concerned with the affairs of your civil administration; you have your own King and Government. I take great interest in your country and the future of the Arab nation. As sons of a young nation you are all interested in the situation at Mosul. I hear with amusement rumours of Turkish aeroplanes in the air, and Turkish forces a few marches out. Not a single Turkish aeroplane has been seen or heard of there, either in the air or on the ground; not a single Turkish soldier on the frontier nor has moved a step nearer Mosul, with your own army is side by side with my air force and land forces to guard against any possible encroachments on your national independence as an Arab State."

REPORT ON AERODROME FACILITIES OF LONDON

BY THE C.A.A.B.

THE second report of the Civil Aviation Advisory Board was published last week as a White Paper (Cmd. 1816). The C.A.A.B. consists, it will be remembered, of the Under-Secretary of State for Air (Chairman), the Director of Civil Aviation, the Air Member for Supply and Research, and representatives of the G.P.O., the Accident Offices Association, the Air League of the British Empire, the Association of British Chambers of Commerce, the Federation of British Industries, the Institute of Transport, Lloyd's, the Royal Aero Club, the Royal Aeronautical Society and the Society of British Aircraft Constructors. The Secretary is Mr. Bertram of the Air Ministry.

Following is the text of the report:—

Terms of Reference.—"To consider and report upon the practicability and cost of increasing the aerodrome facilities of London, with special reference to the convenience to the business centres of the city."

1. Before proceeding to discuss the merits and defects of the several possible sites that might be used as a Civil Aerodrome for London in place of the existing London Terminal Aerodrome at Croydon (Waddon), we desire to place on record the importance we have been forced to attach to considerations other than those of proximity to the business centres of the city to which the terms of reference particularly refer.

2. The size of the Aerodrome and the length of run in all directions, but particularly in a south-westerly direction, as well as the level surface of the site, are all matters of first consideration, but it is also essential that the aerodrome should be generally free from lofty obstructions within a reasonable distance of its boundary. We estimate that with the present classes of commercial aircraft the clear run should be, if possible, not less than 1,000 yards in any direction.

3. It is also of great importance, in our view, that the aerodrome should be as free as possible from the fog and mist with which all the Thames Valley is troubled. In this connection we have examined with care a map, specially prepared for the purpose, showing the range of radiation fog and smoke fog in the neighbourhood of the Metropolis.

4. As the saving in time due to the use of air transport increases in direct proportion to the length of the air journey, we are of the opinion that the average length of flight will increase. For this reason the saving of a few minutes on the road or train journey to the aerodrome of departure for a long Continental air journey, while deserving of attention, should not be allowed to outweigh other considerations which, in our judgment, are of greater importance, such as the safe character of the aerodrome for public civil traffic, due to its size, length of run in all directions freedom from surrounding obstructions, and, above all, its relative freedom from fog, mist and smoke during the winter months.

5. We have further discussed the advisability of recommending the establishment of two, possibly smaller, aerodromes, one to be used especially for passenger traffic and the other for goods and mail services, but in the present stage of development of air transport we have discarded such a proposal as an unnecessary expenditure of money both in initial outlay and in maintenance cost for overhead charges and ground staff, although the advantages in having an alternative aerodrome available for arrival or departure under bad local atmospheric conditions have not been overlooked by us.

6. Some of us have also taken the opportunity of considering the problem from the air during a flight round London, when it was possible to see the alternative sites referred to below and also the proposed extension of the Croydon Aerodrome.

7. In our deliberations we have divided the possible alternative proposals into four main groups:—

(a) The improvement of the existing London Terminal Aerodrome at Croydon (Waddon).

(b) The transference of the London Terminal Aerodrome to one of the other existing aerodromes near London.

(c) The purchase and development of a new site.

(d) The roofing over of a large railway terminus in London for use as an aerodrome.

8. In the presentation of our report we prefer to consider the three latter groups of proposals first, reserving for final consideration the improvement of the Croydon Aerodrome.

9. The aerodromes near London, other than Croydon, that we have considered are Cricklewood and Hendon.

With regard to the former we do not think that it would be suitable for heavy traffic. It would in any case require a

considerable sum spent on levelling if used as a public aerodrome on account of an up-hill "take-off" in one direction; so long, however, as it remains a privately-owned aerodrome it can be regarded as a very valuable auxiliary aerodrome for use in case of emergency.

The Hendon Aerodrome is more suitable for the purpose that we have in view, and the atmospheric conditions in the neighbourhood are fairly good. In the near future the communications will be materially improved, and should provide quick and cheap access from the centre of London. The cost of acquiring the aerodrome is, it is understood, not likely to be prohibitive. We do not, however, anticipate that it will be built over in the immediate future, and therefore we feel that, although we do not recommend its acquisition, it can be regarded as a reserve aerodrome that will still be available during the next few years.

10. Of the twelve alternative new sites which we have considered as possibly suitable for use as an aerodrome, the two which appeared to us as requiring special consideration were the Gunnersbury Park and Wormwood Scrubs sites.

The former has excellent communications and is within about 30 minutes by road of Charing Cross; these communications will be further improved when the scheme of arterial roads has been carried out, as the new Great West Road will adjoin the site on one boundary and the proposed North Circular Road will run along another side. The preparation of the site, which is about 200 acres in extent and nearly level, or, with the purchase of additional land south of the park, about 230 acres, would involve the removal of a large number of trees, the filling up of a pond, and the levelling of a small ridge in the middle of the park. This work might be carried out in conjunction with the road development or as part of a labour scheme of work for the unemployed. The cost of the necessary buildings would, we estimate, be approximately £350,000, and, with the purchase of the land, the scheme would cost about half-a-million pounds in capital expenditure. The site has much in its favour, but its most serious disadvantage is its proximity to the river, and consequently its tendency to be affected by river mist. We desire to submit that the purchase of this site might be a valuable asset in the future, and in the event of its not being required as an aerodrome no loss is likely to be sustained on the purchase value of the land.

Wormwood Scrubs is War Office property administered by the London County Council under the Wormwood Scrubs Act of 1879, and it is largely used as playing fields and for military purposes. If by Act of Parliament arrangements could be made for its use as a London Terminal Aerodrome, it is estimated that the preparation of the site and the erection of buildings would cost about £350,000, to which some £120,000 should be added for the purchase of alternative playing fields, which need not necessarily be all in the same district. The site is rather small, and adjoining land might be difficult and would be expensive to acquire.

11. We have noted with interest, as a possible solution of the problem, proposals which have been brought before us for roofing over one of the large London railway termini, but the length of run so provided would, with the existing type of aircraft, be insufficient, while the cost would be prohibitive. We do not, however, wish to imply that this solution, which would have many advantages, may not eventually be the one most suitable to adopt at some future date.

12. With regard to the proposal to improve the existing aerodrome at Croydon and to increase the area available, the site is about 12 miles from Charing Cross, and is approximately 100 acres in extent, measuring about 800 yards by 750 yards. It is bounded on the west by Plough Lane, which separates the Waddon Aerodrome from what used to be the Beddington Aerodrome. The sheds on a portion of the latter have been retained and the W/T mast and buildings have been erected on the land west of Plough Lane, the two sites being connected by a level crossing across which aircraft can, when necessary, be taxied.

The farm buildings and some of the land on the south of the aerodrome, though Air Council property, are let on a short lease.

13. The Waddon factory at the north-east corner of the aerodrome is in occupation by the Aircraft Disposal Co. It was at one time, we understand, proposed that the aerodrome should be resited, and the administrative centre of the aerodrome, the companies' offices and shed accommodation transferred from their present position to the neighbourhood of the factory, but we do not now recommend

that this proposal should be carried into effect, as we cannot regard the large factory buildings as affording convenient accommodation for use by several operating companies.

14. The present size of the aerodrome is insufficient to cope with any large increase of traffic, and houses are rapidly being erected close to its boundaries. We, therefore, are convinced that a decision should be reached without delay as to the extension or the abandonment of the Croydon Aerodrome, and that if it is accepted that the most satisfactory aerodrome provision for London can be obtained by an improvement of the existing aerodrome, steps towards this end should be taken at once.

15. The site, could, in our opinion, be improved by:—

(a) The purchase of some 75 acres of the old Beddington Aerodrome and two strips of land, one adjoining the road at the south end of the east boundary of the existing aerodrome, and the other at the south-west corner of the aerodrome

(b) The diversion of Plough Lane.

(c) The provision of additional accommodation, and the reorganisation of the existing accommodation on the aerodrome.

(d) A new main arterial road from London to the vicinity of the aerodrome.

16. With regard to (a) the land forming part of the old Beddington Aerodrome which it would be necessary to acquire is on the west side of and adjoining Plough Lane. The land is in course of rapid development for building purposes, and prompt action will be necessary to prevent the whole area from being built over. The cost of acquiring the ground has not been gone into in detail, but it is estimated that it will cost not less than £40,000, with an additional £10,000 for the two strips of land.

17. The diversion of Plough Lane is an integral part of the scheme, but this may entail legislation. The necessary formalities connected with the diversion of the road will undoubtedly be somewhat protracted, and a period of eighteen months may easily elapse before work on this part of the scheme can be commenced. It is considered that £50,000 may be taken as a rough estimate of the cost involved in this diversion.

18. The improvements referred to in (c) above include the erection of three additional flight sheds with tarmac aprons, paths, etc., on land owned but at present let by the Air Council. A new waiting-room for passengers and a building comprising duty and wireless offices in the vicinity of the existing buildings, and an additional tarmac stand for cars should be included in this improvement.

19. The farm buildings and certain coppices should be

cleared on the expiration of the present letting and improvements effected in the surface of the aerodrome.

The total cost of the improvements suggested in paragraph 15, except (d) is estimated at £225,000.

20. In conclusion, having regard to all the considerations involved, we can find no sufficient advantages to warrant us in recommending the abandonment of the Croydon Aerodrome and the establishment of another London Terminal Aerodrome elsewhere.

We are, however, convinced that the Croydon Aerodrome will not be large enough to carry the amount of traffic that will be required of it in the near future, but that with enlargement it would be able to cope with all the requirements that at present can be foreseen.

We suggest, however, that if internal air traffic should develop to such an unexpected extent as to render the Croydon Aerodrome congested, we should be given a further opportunity of considering the question of an additional aerodrome elsewhere.

21. We accordingly recommend that:—

(a) The Croydon Aerodrome should be retained as the London Terminal Aerodrome.

(b) The aerodrome should be enlarged and improved on the lines indicated in paragraphs 15-19 above.

(c) A total sum not exceeding £250,000 should be voted for the purpose.

(d) Any necessary legislation should be promoted and the alterations put in hand and carried through without delay.

(e) Particular attention should be directed to the advantage of selecting for road development those routes which might improve the road communications between London and Croydon.

(f) The necessary steps should be taken to acquire the Gunnersbury Park site with a view to its possible eventual use as an aerodrome.

The report is signed by the following:—

The Duke of Sutherland, Sir W. S. Brancker, Sir W. G. H. Salmond, Brig.-Gen. F. H. Williamson, Mr. J. C. McBride, Mr. G. Holt Thomas, Mr. Stanley Machin, Mr. H. James Yates, Sir W. Joynson-Hicks, Sir Fred Hall, Brig.-Gen. Sir H. C. L. Holden, Lieut.-Col. Mervyn O'Gorman, Sir Henry White-Smith, and Mr. F. G. L. Bertram, Secretary.

Sir Geoffrey Salmond signed the report with the following proviso to be added to recommendation (f) of paragraph 21:—

"provided funds are available, and subject to recommendations (a) to (e) being first carried out."

GLIDING, SOARING AND AIR-SAILING

THE designs submitted for FLIGHT glider competition have now been carefully examined by the judges, Mr. C. R. Fairey and Mr. F. Handley Page, and a number of them, which did not comply with the regulations governing the competition, have been eliminated. The final choice has been narrowed down to three designs. These are now being gone through thoroughly in order to check stress calculations and aerodynamic estimates, and it is hoped that the results of the competition will be available for publication in next week's issue of FLIGHT. The work of checking the calculations necessarily takes some time, and we should like here to express our indebtedness to the judges, both very busy men, who are giving their valuable services absolutely without remuneration, and are lending their stress experts free of charge for the purpose of ensuring that the calculations made by competitors are correct and that every part of the accepted designs is up to the required standard of strength. As the winning glider is chiefly intended for amateur construction, and may conceivably be built by enthusiasts who are not experts in this sort of work, it is, of course, of the utmost importance that we should be able to be satisfied—provided the materials used are sound—with the strength of the structure. Breakages resulting from flaws in the wood or metal are outside our scope, of course, and it will rest with the builders to see that nothing but the specified materials, and these in good condition, are used in the construction. We hope, as already stated, to be able to announce the final decision next week.

THE results of the Biskra meeting appear to be highly creditable for the Dewoitine gliders, three of which were entered. The prize offered by the Resident-General of Morocco, for distance covered in a straight line, was won by

Adjutant Descamps, on a Dewoitine, who covered 5.15.2 kilometres (3.18 miles) by flying from the Ed Delouatt Cliff to Beni-Morra on February 21. On the same day Barbot, on another Dewoitine, covered a little over 4 kilometres.

IN the competition for total time in the air, Descamps was also first, his total time being 21 hrs. 48 mins. 43 secs. Barbot was second, and Thoret third, both mounted on Dewoitines.

THE altitude competition, for a prize presented by the Resident-General of Tunis, was won by Descamps, who reached a height of 540 metres (1,770 ft.) above his starting point. Assuming a gliding angle of 1 in 15 for the machine, this would mean that he could cover, from that height and in still air, a distance of 26,600 ft., or about five miles. With a following wind this might be increased to six or seven miles. It would, therefore, appear that it should be possible for a machine, under favourable conditions, to cover a long range of hills, such as the Downs, by reaching a good height at one section, gliding across a gap and catching the rising currents from the next range before dropping too low. Something of this sort will have to be done in order to win the Selfridge Prize for flying a distance of 50 miles.

IN the meantime, Maneyrol is busy at Vauville, near Cherbourg, where, it is reported, he will soon be joined by Bossoutrot on the Farman "Moustique" and Saint-Aubin on the monoplane of his own design. One of these was on the way to Biskra, but arrived too late to take part in the competition. M. Saint-Aubin is also reported to be building another monoplane fitted with a small engine for the *Petit Parisien* Prize.

PAPERS AT THE ROYAL AERONAUTICAL SOCIETY

Two very interesting papers were read recently before the Royal Aeronautical Society, but, unfortunately, the amount of space taken up by our reports on the Air Conference prevented us from publishing them. One of them, read by Wing-Commander T. R. Cave-Browne-Cave, entitled "The Practical Aspect of Seaplanes," was read on February 15, and the other, by Major F. M. Green, under the heading "Air Travel, with Special Reference to the Helicopter," was read on March 1.

The paper on seaplanes dealt with the practical aspects of the seaplane as seen from the Service, rather than from the commercial, point of view. Wing-Commander Cave-Browne-Cave is O.C., R.A.F. Experimental Establishment, Isle of Grain, and his views and opinions were not altogether personal, but had, he stated, the general concurrence of the pilots at Grain, and for that reason carried considerable weight.

Dealing first with the behaviour of seaplanes in the air, the lecturer called attention to the difference in handling caused by a low centre of gravity and high centre of thrust. The long bow of the hull extending well forward introduced difficulties in directional stability, while the absence of ailerons on the bottom plane usually resulted in rather bad lateral control. Summarising, the lecturer pointed out that such alarming differences as the following result: the nose tended to rise in a side-slip. It was usually necessary to reverse a control in order to check a swing that had once been started, and in order to compensate for switching off the engine it was usually necessary to force the control column almost to its extreme forward limit.

The lecturer stated that two pilots of a 700 h.p. flying boat were often working right up to the limit of their physical strength, and he thought that if ever there was a case for servo-motor control it was in the large flying boat. He suggested trying the experiment of making the two sets of controls independent and worked by separate individuals on the orders of the captain, as it had been found that two pilots sitting side by side worked extremely well together.

Regarding the problems of handling a seaplane on the water, the lecturer pointed out that a good view ahead was essential. The manoeuvrability, on the water, of a single engined seaplane was usually bad because control depended upon the action of the slip-stream on the rudder, which meant considerable forward speed. A water rudder, he thought, improved matters, but should be of larger area than is usual at present. A twin engined machine handled much better on the water owing to the airscrews being set wide out, where they exerted a considerable turning moment.

On the question of towing, Wing-Commander Cave-Browne-Cave stated that in the open sea a flying boat could be towed at considerable speed, and an interesting development was the towing of one flying boat by another.

Turning to the question of seaworthiness, the lecturer first dealt with the tackle used for mooring and towing, and described a mooring shackle, carried by a pair of wires made fast to the foot of an interplane strut on each side of the machine, and by a central wire having at its after end a thimble running on a bridle attached to the bow point and to a point on the keel. When secured in this way the boat rode head to wind, and the bow was free to rise to the waves. As an indication of the seaworthiness of flying boats when properly moored, the lecturer quoted the instance of some flying boats of the Development Flight at the Scillies, which were moored in an open anchorage, while the mother ship lay under shelter inside. The ship had to hoist in all her boats except two, which sank at their moorings before they could be hoisted. The flying boats all reported next morning, ready for a rough-weather towing trial. Reference was also made to instances of flying boats "kiting" off the sea and gliding some distance. To reduce this tendency to fly at moorings, a device was employed during the War, consisting of 9-in. boards secured edge up behind the front of the port lower plane, thereby destroying its lift.

It is a well-known fact that under certain conditions it is a matter of the very greatest difficulty to judge the height of a machine above the surface. This is worst when there is a glassy surface on the water and a low sun to windward. The lecturer referred to the problem of automatic landing with the aid of a hanging stick so connected to the control that it flattened out the machine at the right height above the water. This arrangement, he stated, functioned very well, and rendered a forced landing in fog or darkness much safer than over land.

The lecturer next referred to the difficulties of moving

a seaplane on land, and in getting it on to its trolleys, etc. without damage to the hull bottom. Quite the most important recent development, he thought, was the floating dock designed by the Admiralty and Air Ministry and made at Sheerness. The dock is submerged, and the machine floated into position above pedestals. To show the facility with which a machine may be docked, the lecturer mentioned that on the second occasion of docking a machine at Grain, the boat was lifted clear of the water sixteen minutes after the first line was thrown to the machine.

Turning his attention to points of design, the lecturer stated that the most desirable improvement was in the effectiveness of air control. He thought that the solution of the problem due to the lack of rigidity with which the tail was supported, might be to carry the tail on a fuselage or on two fuselages arranged immediately behind and co-axial with the airscrews. A tail in this position, he thought, would be well protected from water damage.

He also referred to the danger of storage of petrol tanks in the hull in close proximity to wireless telegraph or other electrical gear, and thought that streamlined petrol tanks fitted under the top wing would be preferable, as the rush of air was such that it was almost impossible to ignite petrol leaking from such a tank.

Comparing the "F" and "P" types of boats, the lecturer stated that the latter had a smaller planing bottom and better fore and aft control, so that they attained their full flying speed before taking off. On a development cruise, the "P" type showed a marked superiority, except that considerable damage to the rigid step was experienced, due, he thought, to the presence of a rigid step on a flexible hull.

While dealing with the problems peculiar to the engines of seaplanes, the lecturer stated that starting in cold and wet weather was always troublesome, and thought that there was a very strong case for fitting the gas-starter engine. He thought a small auxiliary engine for pumping, engine starting, warming the water, and perhaps cooking food by the exhaust, would be one of the most valuable uses for a little of the available lift.

The lecturer concluded by stating that flying boats should, if possible, be made weather-proof, so that they could remain moored out, and thus derive all the consequent advantages of safety and immediate readiness for use.

The paper on helicopters by Major F. M. Green was chiefly of interest because the lecturer, working from fundamental principles, came to the conclusion that the helicopter could scarcely compete with the ordinary type of aeroplane.

To begin with, he gave an elementary calculation showing the large diameter airscrews required, i.e., between 35 and 40 ft. for a weight of 1,000 lbs., and a power loading of 53 lbs. per horse-power. In order to bring the size of lifting screw to a reasonable figure it was, he stated, necessary to increase the downward velocity of the air, and consequently the lift in pounds per horse-power must be less. It therefore seemed to him that the power required for keeping the aircraft in flight was likely to be much greater in the helicopter than in the aeroplane.

Concluding his considerations of the problem of power required, the lecturer stated:

"From the foregoing reasons I am convinced that the power expended in flight in a helicopter, flying at speeds found to be useful for aeroplanes, will be very much greater than for the aeroplane, and I believe that, apart from all other disadvantages, this fact alone will render the machine quite impossible for passenger-carrying, at any rate until engines of much less weight per horse-power and materials with much greater specific strength are available. With present-day materials it is my opinion that it is extremely unlikely that it will be possible to make a direct lift machine carrying any useful load which will be able to fly as fast as 80 m.p.h., which is the slowest cruising speed that makes flying worth while in most cases."

One of the chief merits usually accredited to the helicopter is the possibility of rising vertically and alighting vertically. Major Green pointed out that these advantages were unlikely to be as great as might be supposed, and concluded that in any case it seemed that as a means of air travel the helicopter had little future, so that its ability to rise and land in confined spaces was of little value if the ability to fly from place to place at a reasonable speed was absent.

Major Green also referred to the case of engine failure in a helicopter, and pointed out that even neglecting all difficulties of stability, the machine would descend at a

high rate, as the propellers did not offer very much more resistance when spinning than they did when stopped. Continuing, he said:

"A reference to the experiments on the resistance of an airscrew on an aeroplane will show that the increase of resistance is only of the order of 10 per cent. when it is spinning at the velocity which gives the maximum resistance, as against when it is stopped. It is possible that a specially-designed screw would have a somewhat higher resistance than this, but there seems no reason to suppose that much can be gained. The helicopter, therefore, if unchecked, will strike the ground much faster than is convenient or can be readily dealt with by even an elaborate form of shock-absorbing gear. In addition, the whole machine will be moving relative to the ground at or nearly the velocity of the wind."

In conclusion, Major Green referred to the experiments

being made by the Research Department of the Air Ministry on helicopters. He did not, he said, know the precise arguments which led the Air Ministry to undertake work of this description, but he did not think it probable that any useful results would be obtained unless we could make vast improvements in the technique of the production of power and the making of light structures. Such advances would also, he pointed out, improve the design and performance of the ordinary aeroplane. As for the advantages of being able to hover in the case of a machine intended for war purposes, Major Green suggested that a balloon or an airship was a far more promising method of obtaining the required results. It was, he said, likely to cost less and to be safer. Commercially, the object of air travel was to get from place to place, and it seemed to him highly unlikely that the helicopter type of machine would ever afford a useful means of doing this.

LONDON TERMINAL AERODROME

Monday evening, March 5, 1923

It is a good sign that, already, traffic is beginning to improve. Recent better weather has, in fact, had a marked influence in improving the flow of both passengers and goods.

Several times during the week, the Instone Air Line have had to put on extra machines to deal with the influx of passengers on the route to Cologne.

As to air-borne freight, this has shown a marked increase just lately. One of the most significant facts—illustrating, as it does, the part that the aeroplane can play, already, as an express carrier of quite weighty goods—is that the French combined air-lines have recently been given the task of bringing over from Paris a series of complete motor-car engines.

I understand, in fact, that the air transport people have been given a contract to bring over quite a large number of these car engines by aeroplane, and that the rates they have quoted, having regard to the time they save, have quite satisfied the consignors. The engines, and also a number of spare parts, are being brought over in the big Goliath machines.

Boxes of Bullion by Air

THE K.L.M. monoplanes are now carrying in and out of Croydon, in addition to their usual goods-loads, a number of sealed boxes containing bullion.

The night-flying experiments are being continued. On Saturday night the machine got off from Croydon, with Capt. Biddlecombe navigating, and did some very interesting experimental flying. Flying down past Lympne, and out over the Channel, the machine was at one time at a high altitude above clouds, those on board having lost all sight of the earth below. Then a return was made to the English coast. Our illuminations here at Croydon were burning until two o'clock in the morning.

A curious mist phenomenon occurred on Sunday. A Goliath, which had alighted previously at Biggin Hill, came

over with the intention of landing at Croydon. But though those on the 'drome could see the big machine looming through the mist, the pilot himself could not see down through the haze, and, though rockets were fired, he had to return again to Biggin Hill, coming over again and alighting at Croydon this morning.

Fine Weather Visitors to the 'Drome

THE fine weather of Sunday brought a big crowd to the aerodrome, but, curiously enough, there was little doing in the direction of joy-rides. The visitors seemed rather to be of the promenading, looking-on type, and showed no great inclination to book joy-ride flights.

The Flying Services have, by the way, got two D.H.9's ready for delivery to Spain. One of these machines has been up on an altitude test today.

The Daimler Airway finished, on Friday, the special service they have been running to and from Castle Bromwich in connection with the Industries Fair. The service has, it is pleasant to report, been very successful. On one particular day there were so many people waiting to fly from the Fair grounds to London that a special machine had to be sent up from Croydon to augment the normal service. This "air special," leaving Croydon at 9 a.m., was back again with its passengers by twelve o'clock.

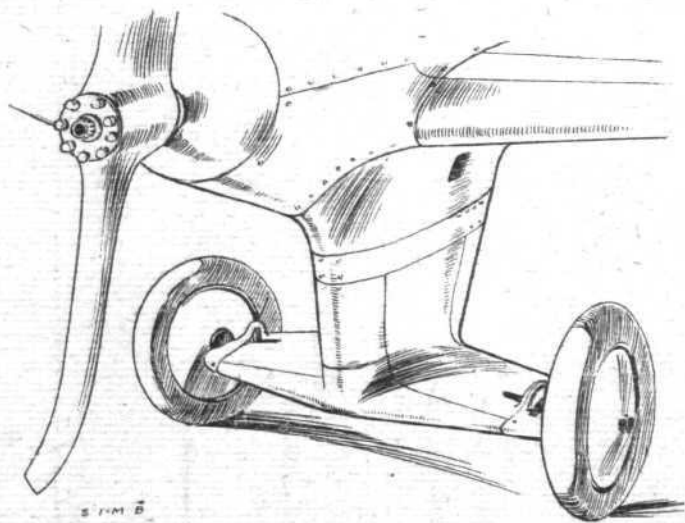
Great satisfaction is expressed on the aerodrome with the report of the Air Ministry committee which has been considering the aerodrome facilities of London, and which has decided so definitely in favour of remaining at Croydon, and carrying out an important programme of improvements. These, one hopes, will be pushed ahead with at once. Experienced pilots, flying to and fro between Croydon and the continent daily, say they feel sure there is no area, anywhere within reasonable reach, which is generally so well-suited as is Croydon to the exigencies of all-the-year-round "airway" working.

CAMS 30-E Tested

THE school flying boat exhibited at the Paris Aero Show by the Chantiers Aero-Maritimes de la Seine, of which Mr. Lawrence Santoni is managing director, was tested recently before representatives of the French Navy, the Service Technique, and representatives of several foreign governments. This machine was fully described and illustrated in our issue of December 28, 1922. With a wing loading of only 6½ lbs./sq. ft. the machine showed a maximum speed of 100 m.p.h., although the engine is a Hispano of 140 h.p. only. The minimum speed was 43 m.p.h., and the climb to 2,000 metres (6,500 ft.) was accomplished in 17 minutes with a useful load of 650 lbs. The CAMS 30-E was also found to be very stable, yet to be easily manœuvrable. A somewhat similar model, but a four-seater, intended for touring, will be put on the market in the spring. It may also be mentioned that Mr. Santoni has entered two machines for the Schneider Race at Cowes on September 28.

Berlin Air Centre.

FROM Berlin it is reported that the discussions relating to making Berlin an important air centre have recently been resumed, and that it is thought that a decision will soon be reached. The intention is to employ the eastern side of the Tempelhofer Field, and if the scheme goes through this will be the main centre of German aviation, not only for the European air lines, but also for internal German flying.



THE S.J.M.B. "FERBOIS":
Sketch showing inverted T undercarriage. (Scale
Drawings on p. 131.)

WINTER MEETING OF THE AERO GOLFING SOCIETY

THE Aero Golfing Society held their Winter Meeting at Richmond Golf Club, Sudbrook Park, on Wednesday, February 28, when some good play took place for the Society's Challenge Cup, presented by Sir Samuel Instone. The results of the play are as follows:—

Aero Golfing Society Challenge Cup Presented by Sir Samuel Instone.

Winner, Air Vice-Marshal A. V. Vyvyan, 88 less 12 = 76. Runner Up, Sir Henry White Smith, 96 less 15 = 81. Other returns, A. J. A. W. Barr, 82; Lieut.-Col. Shelmerdine, 83; L. V. Pearkes, 84; E. N. Clifton, 84; H. E. Perrin, 87; Lieut.-Col. J. T. C. Moore-Brabazon, 87; K. Rankin, 87.

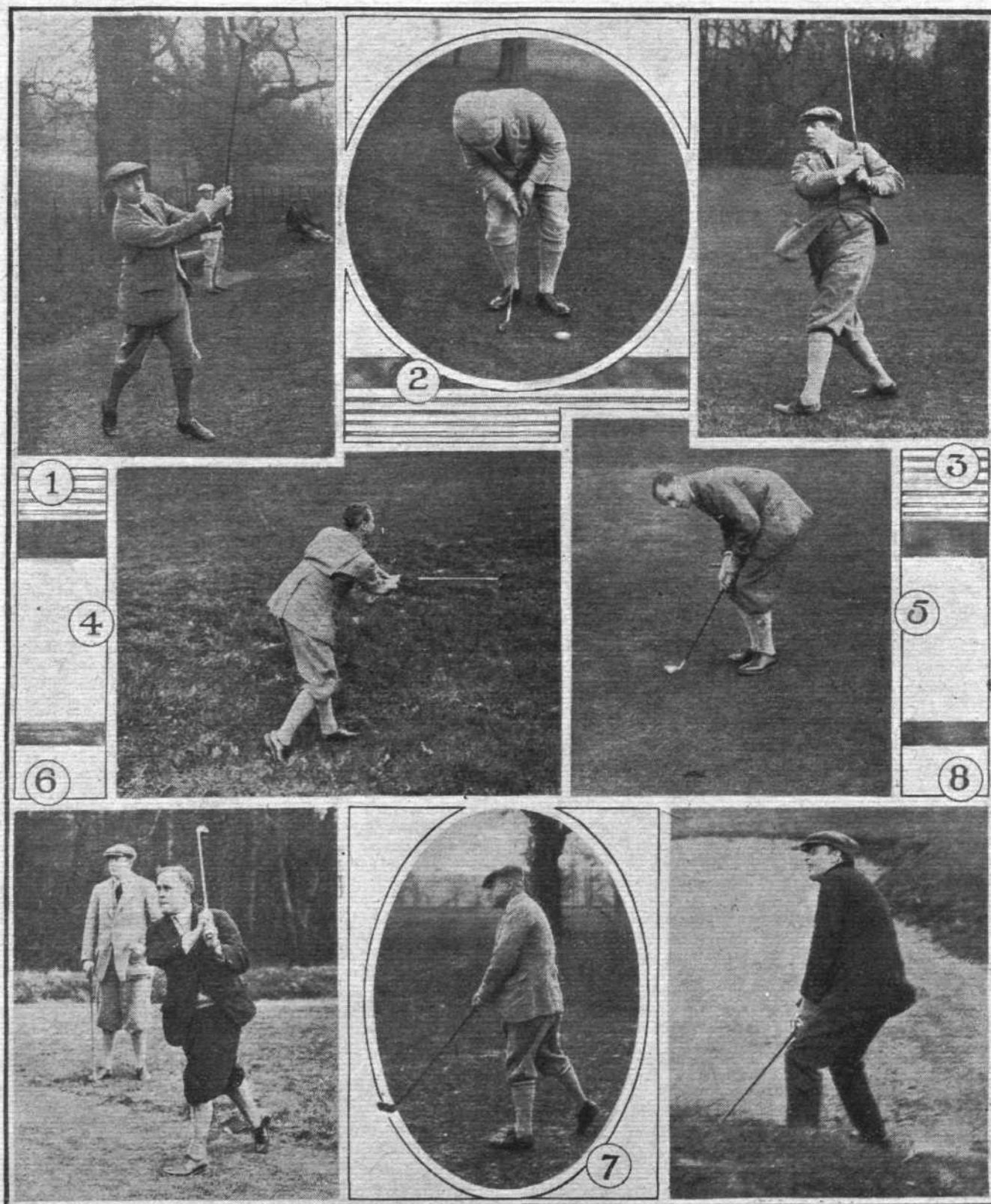
Bogey Foursomes.—Lieut.-Col. F. C. Shelmerdine and Flying Officer F. C. Fitzgibbon, 4 down; H. E. Perrin and

J. Macdonald, 5 down; A. J. A. W. Barr and E. N. Clifton, 5 down.

Mr. F. Cumbers of the British Cellulose Company presented mementos to all competitors making a return.

The following are the fixtures for 1923:—

Spring Meeting, April 26, at Hadley Wood Golf Club. Aero Golfing Society Challenge Cup presented by the Proprietors of FLIGHT; Team Match, May 25, A.G.S. v. Stage Golfing Society at Oxhey Golf Club; Summer Meeting, July 12, at Woking Golf Club. Aero Golfing Society Challenge Cup; Team Match, September 27, A.G.S. v. Paper Trade Golfing Society. (Course to be arranged); Autumn Meeting, November 1, at St. George's Hill Golf Club. Aero Golfing Society Challenge Cup presented by Cellon (Richmond), Ltd.



AERO GOLFING SOCIETY FORM : A few snaps at the meeting at Sudbrook Park for the Society Challenge Cup. 1. Mr. T. O. M. Sopwith driving from the first tee. 2. "Plan View" of Col. Bristow taking the fourth hole in three. 3. Mr. C. R. Fairey makes a good approach to the 13th green. 4. Major Mayo in the rough, approaching the 14th green. 5. A. J. A. Wallace-Barr putting on the first green. 6. Mr. Harold Perrin driving from the 13th tee. 7. Sir Henry White-Smith driving from the 14th tee. 8. Col. Moore-Brabazon bunkered.

THE ROYAL AIR FORCE

London Gazette, February 27, 1923
General Duties Branch

Flight Cdt. M. W. Keay, having successfully passed through Cadet College, is granted permanent commn. as Pilot Offr.; Feb. 3. Pilot Offr. I. P. Anderson to be Flying Offr.; Jan. 29.

The following are transferred to Reserve:—
Class A.—Flying Offr.—E. Marsden; Feb. 16. Flight Lieut.—S. Frost; Feb. 15. Flying Offrs.—W. Allen, R. B. Dormor; Feb. 15.
Class C.—Flying Offr.—O. E. Sharpe; Feb. 16.
Flying Offr. A. De C. McG. Denny (Lieut. R.F.A.) relinquishes his temp.

commn. on retirement from the Army; Feb. 24. The short service commns. of Pilot Offrs. E. J. Heaven and R. F. Daniell are terminated on cessation of duty; Feb. 28.

Medical Branch

Flt. Lieut. (actg. Sqdn. Leader) F. C. Kempson, M.B., B.A., relinquishes his temp. commn. on ceasing to be empld., and is permitted to retain the rank of Maj.; Nov. 1, 1922.

Memorandum

The permission granted to Lieut. L. Speller to retain his rank is withdrawn on his enlistment; Feb. 8.

ROYAL AIR FORCE INTELLIGENCE

Appointments.—The following appointments in the Royal Air Force are notified:—

Group Captains: A. Fletcher, C.M.G., C.B.E., M.C., from Aircraft Depot (Iraq Command) to Headquarters Iraq Command (Supernumerary). 20.12.22. Hon. J. D. Boyle, C.B.E., D.S.O., from Headquarters, Iraq Command, to Station Commandant (Iraq Command), for duty as Commandant. 1.10.22.

Wing Commander W. C. Hicks, A.F.C., from Headquarters, Iraq Command, to Command Aircraft Depot (Iraq Command). 20.12.22.

Squadron Leaders: P. A. Shepherd, from H.M.S. "Ark Royal" (Mediterranean) to R.A.F. Depot (Inland Area) (Supernumerary). 4.2.23. J. B. Graham, M.C., A.F.C., from No. 1 Squadron (Iraq Command) to R.A.F. Depot (Inland Area) (Supernumerary). 14.1.23. C. C. Durston, from Headquarters, R.A.F. (India) to R.A.F. Depot (Inland Area) (Supernumerary). 19.1.23. H. G. Jones, from School of Photography (Inland Area) to R.A.F. Depot (Inland Area) (Supernumerary). 22.1.23. A. J. Miley, O.B.E., from No. 267 Squadron (Mediterranean) to H.M.S. "Ark Royal" (Mediterranean). To command R.A.F. Unit. 19.2.23. J. Kemper, M.B.E., from No. 4 Flying Training School (Middle East) to Basrah Group Headquarters (Iraq Command). 5.1.23. Substituted for the entry concerning this officer which appeared in R.A.F. Bulletin No. 103, dated 31.1.23. F. G. D. Hards, D.S.C., D.F.C., from Headquarters, Iraq Command, to Station Commandant (Iraq Command). 1.10.22. R. H. Knowles, M.D., D.P.H., from Headquarters, Iraq Command, to R.A.F. Depot (Inland Area) (Supernumerary). 14.1.23.

Flight Lieutenants:—H. W. G. Jones, M.C., from R.A.F. Depot (Inland Area) to R.A.F. Cadet College (Flying Wing) (Cranwell). 23.2.23. V. S. E. Lindop, from No. 28 Squadron (India) to R.A.F. Depot (Inland Area) (Supernumerary). 19.1.23. A. F. Brooke, from R.A.F. Depot (Inland Area) to Boys' Wing (Cranwell). 26.2.23. E. Drudge, M.B.E., from R.A.F. Depot (Inland Area) to School of Photography (Inland Area). 22.2.23. R. A. Young, from R.A.F. Depot (Inland Area) to School of Technical Training (Men) (Inland Area). 26.2.23. P. C. Livingston, D.P.H., from R.A.F. Central Hospital (Coastal Area) to Central Medical Board (Coastal Area). 19.2.23.

C. Y. Roberts, from Headquarters, R.A.F. (India) to No. 60 Squadron (India). 28.1.23. F. J. Cooke, from No. 1 School of Technical Training (Boys) (Halton) to No. 1 Stores Depot (Kidbrooke). 1.3.23. W. R. Fairbairn, from R.A.F. Depot (Inland Area) to No. 1 School of Technical Training (Boys) (Halton). 26.2.23. E. G. S. Hall, M.B., to Research Laboratory and Medical Officers' School of Instruction (Coastal Area). On appointment to Short Service Commission in Medical Branch. For short course of instruction. 15.2.23. R. D. Oxland, from Headquarters, Iraq Command, to Headquarters, R.A.F., Middle East. 14.1.23. T. H. McDowell, from Headquarters, R.A.F., India, to Aircraft Depot (Iraq Command). 5.1.23. H. W. Woollett, D.S.O., M.C., from Stores Depot (Iraq Command) to Mechanical Transport Workshops and Pool (Palestine Command). For duty as Adjutant. 14.1.23. R. F. L. Dickey, D.S.C., from School of Naval Co-operation and Aerial Navigation (Coastal Area) to No. 45 Squadron (Iraq Command). For duty as Adjutant. 13.12.22. Substituted for the notification which appeared in R.A.F. Bulletin No. 94, dated 20.12.22., wherein this officer was posted to No. 6 Squadron, with effect from 13.12.22. I. M. Matheson, from Armament and Gunnery School (Inland Area) to No. 45 Squadron (Iraq Command). 13.12.22. Substituted for the notification which appeared in R.A.F. Bulletin No. 94, dated 20.12.22., wherein this officer was posted to No. 70 Squadron, with effect from 13.12.22. G. Y. Tyrrell, M.C., from No. 30 Squadron (Iraq Command) to Headquarters, Iraq Command. 26.1.23. F. H. Laurence, M.C., from R.A.F. Depot (Inland Area) to No. 2 Flying Training School (Inland Area). 23.2.23. H. P. Lale, D.S.O., D.F.C., from School of Technical Training (Men) (Inland Area) to No. 24 Squadron (Inland Area). 23.2.23. C. Bompfrey, D.F.C., from R.A.F. Base, Gosport (No. 3 Squadron) (Coastal Area), to Seaplane Training School (Coastal Area). 15.3.23. W. R. Westcombe, from R.A.F. Depot (Inland Area) to M.T. Repair Depot (Inland Area). 13.2.23. **Colonel (Temp. Col. Commandant)** E. W. Costello, V.C., C.M.G., C.V.O., D.S.O., as Colonel Commanding Troops (Palestine Command). On attachment to Royal Air Force. On appointment to Command Palestine Brigade. 15.6.22.

IN PARLIAMENT

R.A.F. Staff Motor-Cars, Iraq

MR. ERSKINE, on February 28, asked the Under-Secretary of State for the Colonies how many staff motor-cars are maintained in Iraq at the expense of the British Treasury?

Sir S. Hoare: I have been asked to reply. The number of staff motor-cars at present in use by the Royal Air Force in Iraq is 12.

Air Strength, Great Britain and France

MR. LAMBERT asked the Secretary of State for Air what are the numbers of personnel and of squadrons of the Air Forces of France and Great Britain respectively, at the latest available date?

Sir S. Hoare: It is impossible for me to give the complete number of personnel of the Air Force of France, as many of the functions of the French Air Force are carried out by naval and military personnel. The only official figure that I can give the right hon. member in this connection is 37,730 for the naval, military, and colonial air services, but I would point out to the right hon. gentleman that these services are not accurately comparable with the Royal Air Force. I would refer the right hon. gentleman in this connection to the explanation on this point which I gave to the hon. and gallant Member for Hull on 14th December. The latest figure regarding the number of French squadrons is 140 (of nine machines, on the average). The British figures are: Number of personnel, 29,306; number of squadrons, 32 (of 12 machines, on the average).

Flying Boats and Seaplanes

LORD APSLEY asked the First Lord of the Admiralty how many additional flying boats as well as seaplanes have been added to the strength of the Navy; and what number have been constructed, or are being constructed, since July, 1921?

Sir S. Hoare: I have been asked to reply. So far as the Navy is concerned, 14 seaplanes are serving with or are available for service in Fleet carriers. There are five flying boats under the orders of the Air Officer Commanding, Coastal Area, and five under the Air Officer Commanding, Malta, which are detailed for co-operation with the Fleet, and which work from a shore base. With regard to modern developments in aircraft, 10 flying boats and 12 float seaplanes have been constructed since July, 1921, or are at present being constructed for service with the Navy. These numbers do not take account of 33 flying boats and amphibians of various experimental types which have been tried or put under construction since that date. A comparison between July, 1921, when the obsolescent war types were still in service, and February, 1923, when the old stock has been largely scrapped and the new and improved types are being substituted, would not be a useful or fair comparison. The period was one of transition and change-over from an older to a newer equipment, and the newer equipment was itself, moreover, largely of an experimental kind, for which it would have been bad policy to place large orders prematurely. I may add that the policy of development which is being followed has been agreed upon between the Admiralty and the Air Ministry.

Personnel of Subsidised Companies

LIEUT.-COL. NALL on March 1 asked the Secretary of State for Air how many pilots and how many other persons in grades corresponding to Air Force ranks are employed by companies in receipt of the civil aircraft subsidy?

Sir S. Hoare: 18 pilots and 117 ground engineers, fitters, riggers, storemen, labourers, clerks and other miscellaneous employes are employed by the three companies in question. It would not be practicable to classify them in grades corresponding to Air Force ranks.

Lieut.-Col. Nall: Does it not occur to the right hon. gentleman that the numbers employed are very small for the money expended by the State?

Sir S. Hoare: Yes, Sir; it has certainly occurred to me that that is so; and it is on that account that I am reconsidering the whole question.

Lieut.-Col. Nall: Will the Government consider whether better value would not be obtained by diverting this money to augmenting the regular Air Force?

Sir S. Hoare: Yes, I am considering that with the other relevant questions at issue.

Royal Navy Air Arm

VISCOUNT CURZON, on March 5, asked the Prime Minister whether the Government has as yet come to any decision on the question of whether the Royal Navy is to have the sole control and responsibility for its own air arm?

The Prime Minister: I have decided to appoint a Committee to enquire into the co-operation and correlation of the three Services from the point of view of national and imperial defence, of which the question will form a specific part.

Viscount Curzon: Can we have some indication of the terms of reference to this Committee? Will the question be decided as a whole, or will the naval question have prior consideration?

The Prime Minister: The terms of reference are being prepared. I can say no more at present. As to the second question, I should like to have notice of that.

Captain W. Benn: Can we have an assurance that no action will be taken to disintegrate the Air Force without the direct consent of this House?

Commander Bellairs: Is the right hon. gentleman aware that we had a direct promise last spring from the then Leader of the House that a Committee would be appointed? How is it we have no result from that?

The Prime Minister: That Committee sat but did not report. This Committee will, I hope, both sit and report.

Capt. W. Benn: Will the right hon. gentleman answer my question?

The Prime Minister: I would not like to say that no change will be made before it has been laid before the House, but it is very unlikely.

Mr. Pringle: Can we have the names of the members of the Committee?

The Prime Minister: The members have been selected, but we have not yet got their consent.

Sir H. Brittain: Has any time limit been fixed for the deliberations of the Committee?

followed at 7 p.m. by the Presidential Address, delivered by Colonel Moore-Brabazon. At the conclusion of this the President will read a paper on "Aerial Photography," illustrated by lantern slides. A discussion will follow, in which any who desire are invited to join.

Institution of Aeronautical Engineers

We have been requested to call attention to the Annual Meeting of the Institution of Aeronautical Engineers, which is being held tomorrow (Friday, March 9) at the Engineers' Club, Coventry Street. The preliminary proceedings will be

THE CELLON "CERRIC" PRODUCTS

We referred last week, in connection with the British Industries Fair just closed, to the "Cerric" products manufactured by Cellon (Richmond), Ltd. We now give more detailed particulars of these materials, which we hope will be of interest to our readers. While the "Cerric" materials are not entirely associated with aircraft work, there are many instances where they can be utilised with advantage in this connection. Furthermore, they are, to a certain extent, a development of the famous "Cellon" aircraft dopes and enamels, hence a reference to them in *FLIGHT* is not, we trust, out of place.

Now, as to what "Cerric" products are. During the past twelve years or so, Cellon, Ltd., have carried out a considerable amount of research and laboratory work in the matter of the various cellulose constituents for the production and development of the "Cellon" dopes. The valuable knowledge thus obtained of the properties, etc., of the cellulose and other components employed, has enabled them to extend their application to other uses than that of doping aircraft fabrics—in other words, a means has been developed of "doping" a variety of articles in everyday use, thereby preserving their surface and also producing an artistic finish.

"Cerric," therefore, is a species of "dope" for general use, and while different from the aeroplane dope and varying according to the particular use to which it is being put, its base is primarily cellulose, and its effect is to give to the article treated a thin, hard film over the surface.

The various "Cerric" specialities, to suit different kinds of work, are as follows:—

"Cerric" Enamels.—For articles requiring a matt or highly-finished glossy surface, such as fancy boxes, tins, baskets, table tops, trays, ornaments, etc. The enamels, which are made in all colours, are easily and quickly applied by spray or dipping, and dry very rapidly with an "eggshell" finish, a glossy surface being obtained by buffing, or by a final coat of "Cerric" varnish. An important feature in connection with these enamels is that they are not affected by hot articles standing on them, nor by spirits, petrol, water and oil. Unglazed clay pottery can be very effectively treated with "Cerric," and the results are not only pleasing—equal in finish and artistic effect to any high-class fire-glazed pottery—but pottery so treated is water-proof.

"Cerric" White Enamel, or "Porcelac."—This produces a porcelain-like surface, and being antiseptic and washable is specially suitable for surgical fittings, sanitary and hospital furniture, bath-room fittings, etc.

"Cerric" Black Enamels.—These give "dead matt," "matt," "semi-matt," or "glossy" finishes. They do not require stoving and do not chip or crack, and are thus very suitable for motor or aviation accessories, lamps, instruments and woodwork.

"Cerric" Lacquers.—These are suitable for all kinds of lacquer work, and are easily applied by spray, brush or dipping. They are colourless, and do not affect the colour of any metal article so treated. Coloured lacquers in all shades of gold, or any special colour, are also made.

"Cerric" Wood Solutions.—These take the place of French polishing, exactly similar finishes being obtained without the long and tedious—to say nothing of the skilful—process associated with French polishing. They are transparent, and are applied by spray, the wood having first been treated with "Cerric" wood filler (by spray) and stained the desired shade. A final highly-polished finish is obtained either by buffing or by the usual method of hand polishing. It is of interest to note that wood surfaces treated by this "Cerric" method may, when and if necessary, be "brightened up" with ordinary French polish. As with other "Cerric" mediums, these "Cerric" wood solutions withstand the action of spirit, water, petrol, etc., and are not affected by the contact with hot articles—which is not the case with French polish.

"Cerric" Bronzing Mediums.—These are for finishing picture frames, mouldings, mounts, furniture, fancy goods, etc. A metallic powder of any desired shade is mixed with "Cerric" Medium and applied to the article by spray, or, with a special medium, by brush or rollers, and a beautiful finish is obtained which will not crack or chip, nor rust or tarnish.

"Cerric" Leather Solutions.—These are supplied in black and all colours, and leather treated with them is preserved and will not lose its flexibility. Artificial leather solutions, for leather cloth and leatherette paper, are also supplied in all colours, waterproof and flexible.

Other "Cerric" products consist of wall-paper solutions, matt, glossy and waterproof; paper varnishes for posters, show cards, etc.; transparent colours for electric lamp bulbs, etc.

SOCIETY OF MODEL AERONAUTICAL ENGINEERS (London Aero-Models Association)

The Annual General Meeting will be held at Headquarters on Friday, March 16, 1923, at 7.30 p.m.

On March 23, Mr. A. F. Houlberg will give a lecture, his subject being "Power Plants for Model Aeroplanes." It is hoped that Members will make an effort to be present.

The programme for 1923 has been submitted by the Sub-Committee and passed by the General Purposes Committee. It is now in the printer's hands.

A Challenge Cup has been presented to the Society by Mrs. S. Jones, and it was unanimously agreed that it should be known as the S.M.A.E. Cup. A hearty vote of thanks was passed to the donor for making such a magnanimous gift.

The Editor of the *Model Engineer* has presented a cup in appreciation of the collective display of models loaned by the Members of the S.M.A.E. at the last *Model-Engineer* exhibition. This has been greatly appreciated by the Members, and a hearty vote of thanks passed to Mr. Percival Marshall.

A. E. JONES.
Hon. Sec.

PUBLICATIONS RECEIVED.

Aeronautical Research Committee, Reports and Memoranda. No. 793 (Ae. 50). On a Method for the Direct Design of Framed Structures having Redundant Bracing. By A. J. Sutton Pippard, M.B.E. May, 1922. London: H.M. Stationery Office, Kingsway, W.C. Price 4d. net; by post 4½d.

Militärwissenschaftliche und Technische Mitteilungen (Fortsetzung der M.A. u. G.). January-February, 1923. Vienna: Getreidmarkt 9.

Mūsų Žinynas, Karo Mokslo ir istorijos žurnalas. Vol. III. No. 9. Laisves Aleja 12, Kaunas.

AERONAUTICAL PATENT SPECIFICATIONS

Abbreviations: cyl. = cylinder; I.C. = internal combustion; m. = motor. The numbers in brackets are those under which the Specifications will be printed and abridged, etc.

APPLIED FOR IN 1921

Published March 8, 1923

- 21,038. A. CHESIN. Speed-indicators for aircraft, etc. (167,503.)
- 29,303. G. HORN. Device for training pilots and observers. (192,754.)
- 29,910. J. B. PASSAT. Means for varying and controlling pitch of screw propellers. (192,784.)
- 30,563. J. L. DEMARTINI. Revolving-cylinder I.C.m. (192,811.)
- 81,068. RAUL, MARQUIS OF PATERAS PESCARA. Screw propellers for helicopters. (171,706.)
- 83,932. H. JUNKERS. Starting of I.C. engines. (179,508.)

APPLIED FOR IN 1922

Published March 8, 1923.

- 2,465. A. SEAY. Screw propellers. (192,908.)
- 10,316. H. O. SHORT. Construction of wings, etc. (192,966.)

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